

## User's Manual





## SW USB Series

### USB Switchers

# Precautions

## Safety Instructions • English

- 


This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.
- 


This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

### Caution

- Read Instructions** • Read and understand all safety and operating instructions before using the equipment.
- Retain Instructions** • The safety instructions should be kept for future reference.
- Follow Warnings** • Follow all warnings and instructions marked on the equipment or in the user information.
- Avoid Attachments** • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

## Consignes de Sécurité • Français

- 


Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).
- 


Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

### Attention

- Lire les instructions** • Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.
- Conservser les instructions** • Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.
- Respecter les avertissements** • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.
- Eviter les pièces de fixation** • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

## Sicherheitsanleitungen • Deutsch

- 


Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.
- 


Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

### Achtung

- Lesen der Anleitungen** • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits- und Bedienungsanleitungen genau durchlesen und verstehen.
- Aufbewahren der Anleitungen** • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.
- Befolgen der Warnhinweise** • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.
- Keine Zusatzgeräte** • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

## Instrucciones de seguridad • Español

- 


Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.
- 


Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

### Precaucion

- Leer las instrucciones** • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.
- Conservar las instrucciones** • Conservar las instrucciones de seguridad para futura consulta.
- Obedecer las advertencias** • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.
- Evitar el uso de accesorios** • No usar herramientas o accesorios que no sean específicamente recomendados por el fabricante, ya que podrían implicar riesgos.

## 安全须知 • 中文

- 

这个符号提示用户该设备用户手册中有重要的操作和维护说明。
- 

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

### 注意

- 阅读说明书** • 用户使用该设备前必须阅读并理解所有安全和使用说明。
- 保存说明书** • 用户应保存安全说明书以备将来使用。
- 遵守警告** • 用户应遵守产品和用户指南上的所有安全和操作说明。
- 避免追加** • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

### Warning

- Power sources** • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.
- Power disconnection** • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).
- Power cord protection** • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.
- Servicing** • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.
- Slots and openings** • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.
- Lithium battery** • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

### Avertissement

- Alimentations** • Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.
- Déconnexion de l'alimentation** • Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.
- Protection du cordon d'alimentation** • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.
- Réparation-maintenance** • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.
- Fentes et orifices** • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.
- Lithium Batterie** • Il a danger d'explosion s'il y a remplacement incorrect de la batterie. Remplacer uniquement avec une batterie du même type ou d'un ype équivalent recommandé par le constructeur. Mettre au reut les batteries usagées conformément aux instructions du fabricant.

### Vorsicht

- Stromquellen** • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.
- Stromunterbrechung** • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stromversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.
- Schutz des Netzkabels** • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.
- Wartung** • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.
- Schlitze und Öffnungen** • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.
- Litium-Batterie** • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

### Advertencia

- Alimentación eléctrica** • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.
- Desconexión de alimentación eléctrica** • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.
- Protección del cables de alimentación** • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.
- Reparaciones/mantenimiento** • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.
- Ranuras y aberturas** • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalentamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.
- Batería de litio** • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

### 警告

- 电源** • 该设备只能使用产品上标明的电源。设备必须使用有地线的供电系统供电。第三条线（地线）是安全设施，不能不用或跳过。
- 拔掉电源** • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。
- 电源线保护** • 妥善布线，避免被踩踏，或重物挤压。
- 维护** • 所有维修必须由认证的维修人员进行。设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。
- 通风孔** • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。不要用任何东西挡住通风孔。
- 锂电池** • 不正确的更换电池会有爆炸的危险。必须使用与厂家推荐的相同或相近型号的电池。按照生产厂的建议处理废弃电池。

---

### **FCC Class A Notice**

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions:

- (1) This device may not cause harmful interference.
- (2) This device must accept any interference received, including interference that may cause undesired operation.

The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

**NOTE** *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

---

# Table of Contents

---

<b>Chapter One • Introduction</b>	1-1
<b>About this Manual</b>	1-2
<b>About the SW USB Series</b>	1-2
<b>Features</b>	1-2
<b>Application Diagrams</b>	1-3
<b>Chapter Two • Installation</b>	2-1
<b>Installation Overview</b>	2-2
<b>Mounting the SW USB Series Switcher</b>	2-3
Tabletop use	2-3
Rack mounting	2-3
UL rack mounting guidelines	2-3
Rack mounting procedure	2-4
Furniture mounting	2-5
<b>Rear Panel Features</b>	2-6
<b>Wiring the Power Connector</b>	2-8
<b>Wiring for RS-232 Communication</b>	2-9
RS-232 port	2-9
RS-232 Pass Thru port	2-10
<b>Contact Closure Control</b>	2-11
Controlling an Extron A/V switcher (Loop 0 mode)	2-11
<b>Connecting Multiple SW USBs in a System</b>	2-12
<b>Chapter Three • Operation</b>	3-1
<b>Front Panel Features</b>	3-2
<b>Operations</b>	3-2
Powering on the system	3-2
Selecting an input	3-3
Selecting an input from the front panel	3-3
Selecting an input using contact closure	3-3
Selecting an input using SIS commands	3-3
Selecting an input using the keyboard (SW4 USB Plus only)	3-3
Issuing commands to an Extron A/V switcher via the RS-232 Pass Thru port	3-4
Selecting the loop mode	3-4
SIS command processing	3-4
Commands that cannot be passed through	3-5
Sending commands to an A/V switcher using contact closure	3-5
Enabling front panel lockout (executive mode)	3-6
Resetting	3-6

## Table of Contents, cont'd

---

Host emulation (SW4 USB Plus only).....	3-6
Setting up for host emulation .....	3-7
Supported peripheral devices.....	3-7
Troubleshooting .....	3-8
Peripheral emulation (SW4 USB Plus only).....	3-8
<b>Updating Firmware</b> .....	3-8
Downloading and installing the Firmware Loader.....	3-8
Downloading and installing the SW USB firmware.....	3-9
Loading the firmware to the SW USB using the Firmware Loader .....	3-10
<b>Chapter Four • SIS Programming and Control</b> .....	4-1
<b>Host-to-Switcher Communications</b> .....	4-2
Switcher-initiated messages .....	4-2
Error responses .....	4-2
<b>Using the Command/Response Table</b> .....	4-2
Symbol definitions .....	4-3
Command/response table for SIS commands .....	4-4
<b>Appendix A • Specifications, Part Numbers, and Accessories</b> .....	A-1
<b>Specifications</b> .....	A-2
<b>Included Parts</b> .....	A-4
<b>Accessories</b> .....	A-4
Optional accessories .....	A-4
Mounting options.....	A-4

*All trademarks mentioned in this manual are the properties of their respective owners.*



## **SW USB Series**

# 1 **Chapter One**

## **Introduction**

About this Manual

About the SW USB Series

Features

Application Diagrams

# Introduction

---

## About this Manual

This manual describes the Extron SW2 USB, SW4 USB, and SW4 USB Plus switchers and provides instructions on installing, configuring, and operating them. The term “SW USB” is used throughout this manual to refer to all models.

## About the SW USB Series

The Extron SW2 USB, SW4 USB, and SW4 USB Plus switchers make it possible for two or four host computers to share and switch between up to four peripheral USB devices such as mass storage devices, keyboards, mice, and other human interface devices (HIDs). They function as USB hubs with switching and device emulation, so that connections are maintained between host computers and peripherals.

## Features

A number of specialized features help to streamline system integration, including port status indication, RS-232 pass-through, front panel security lockout, and multiple control points.

**Outputs** — Four female USB type A connectors act as a USB hub. Each port supplies the 500 mA, 5 V rating required in the USB specification.

**USB 2.0 compatibility** — The SW USB switchers are backward compatible with all previous USB data rate standards, including low speed (1.5 Mbps), full speed (12 Mbps), and high speed (480 Mbps).

**Mounting** — The SW USB Series switchers have compact 1U high, ½-rack wide, 3 feet deep metal enclosures that can be mounted on a rack shelf or under or through furniture.

**Host and peripheral emulation** — The SW4 USB Plus model offers increased system reliability by providing an uninterrupted connection between host and peripheral devices.

- **Host emulation:** When a keyboard or a mouse is connected to port 3 or 4 and the appropriate rear panel DIP switch is set to On, the SW USB switches to the connected keyboard or mouse instantly. See “[Host emulation \(SW4 USB Plus only\)](#),” in chapter 3, “Operation,” for more information.
- **Peripheral emulation:** The SW USB provides problem-free boot-up by constantly emulating a keyboard and/or mouse to the computer or other input device, regardless of whether or not a keyboard or mouse is actually connected.

**Power supply** — An external power supply is provided for worldwide compatibility.

**RS-232 control and pass-through** — The SW USB switcher can be controlled via SIS™ (Simple Instruction Set) commands received via an RS-232 interface. These SIS commands can be sent to an RS-232 controllable Extron A/V switcher attached to the SW USB’s RS-232 Pass Thru port. (See chapter 4, “[SIS Programming and Control](#),” for an explanation of the available SIS commands.)



---

**Contact closure control** — Connecting a push-button contact closure device to the SW USB's Contact port or shorting pin 1, 2, 3, or 4 to the ground ( $\equiv$ ) pin of the Contact port provides an alternative method of input selection on the SW USB. Commands issued via contact closure can also be passed through the RS-232 Pass Thru port to an attached RS-232 controllable Extron switcher. See "[Contact Closure Control](#)", in chapter 2, "Installation", for more information.

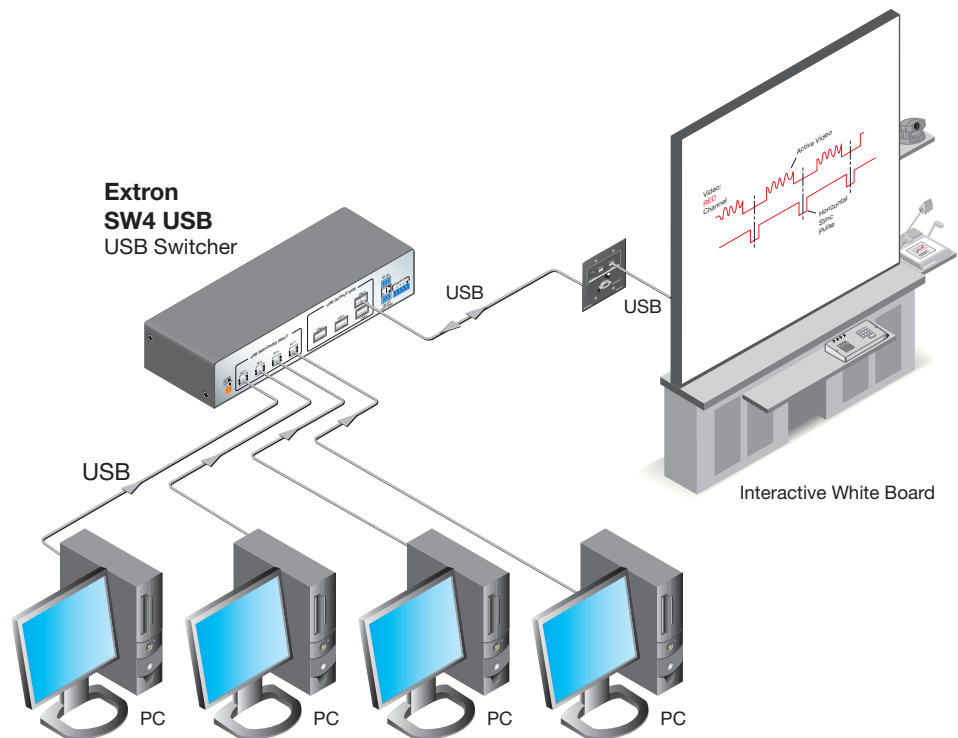
**Hot key switching** — (SW4 USB Plus only) When host emulation is enabled, inputs can be selected by a combination of key presses on a keyboard connected to port 3 or 4.

**Front panel security lockout (executive mode)** — To prevent unauthorized access to the switchers, executive mode can be enabled via the front panel or SIS commands to disable all front panel controls.

**Port status LEDs** — The Active USB LEDs provide visual indication of port status/activity for USB peripherals and all connected and active host devices.

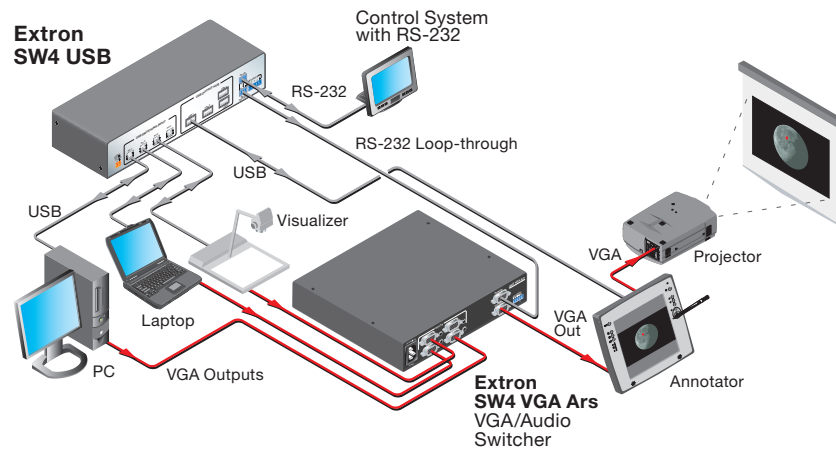
## Application Diagrams

The following diagrams show examples of how an SW USB Series switcher may be connected.

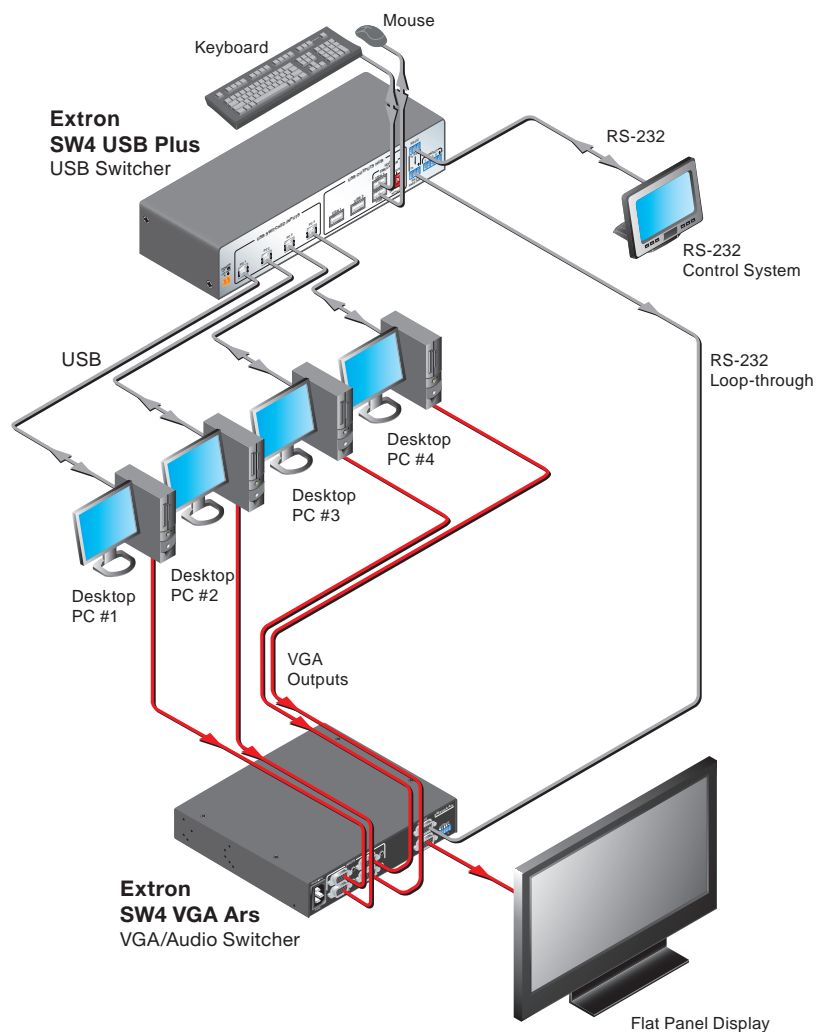


**Connection diagram for an SW4 USB switcher with interactive white board**

## Introduction, cont'd



**Connection diagram for an SW4 USB switcher with an SW VGA Series switcher in an annotator application**



**Connection diagram for an SW4 USB Plus switcher in a keyboard/video/mouse (KVM) switching application**



## **SW USB Series**

# 2 **Chapter Two**

## **Installation**

Installation Overview

Mounting the SW USB Series Switcher

Rear Panel Features

Wiring the Power Connector

Wiring for RS-232 Communication

Contact Closure Control

Connecting Multiple SW USBs in a System

# Installation

---

## Installation Overview

To install and set up the SW USB switcher,

- 1 Mount the switcher on a rack shelf or under furniture, if desired. (See [“Mounting the SW USB Series Switcher”](#), below.)
- 2 Connect host device(s) to one or more SW USB input connectors, using USB cable lengths of up to 15 inches (4.5 m) and USB B connectors.
- 3 Connect one or more peripheral USB devices to the SW USB Output Hub ports, using USB cable lengths of up to 15 inches (4.5 m) and USB A connectors.
- 4 If desired, connect an RS-232 cable to the SW USB’s RS-232 port and to a host computer or control system. (See [“Wiring for RS-232 Communication,”](#) later in this chapter.)

**NOTE** *Your RS-232 computer or control system should not be one of the host devices connected to any of the input ports. Use a separate computer for RS-232 communication.*

- 5 If desired, connect an external Extron A/V switcher to the RS-232 Pass Thru port. This switcher can then be controlled via commands sent through this port.
- 6 If desired, wire one of the provided three-pole or five-pole captive screw plugs to a 2-button or 4-button contact closure device, and connect the device to the SW USB’s Contact port. (See [“Contact Closure Control,”](#) later in this chapter.)
- 7 If using a different power supply from the one that was provided, wire a 2-pin captive screw connector to the external power supply. (See [“Wiring the Power Connector,”](#) later in this chapter.)
- 8 SW4 USB Plus only: If desired, attach a keyboard and/or mouse to output port 3 and/or 4, and set the appropriate DIP switch(es) for host emulation. (See [“Host emulation \(SW4 USB Plus only\),”](#) in chapter 3, “Operation.”)
- 9 Power on the USB peripheral devices, if applicable.
- 10 Power on the SW USB switcher.
- 11 Power on the host device(s).

---

## Mounting the SW USB Series Switcher

The SW USB Series switcher can be set on a table, mounted on a rack shelf, or mounted under a desk, podium, or table.

### Tabletop use

Four adhesive rubber feet are included with the SW USB switcher. For tabletop use, attach one foot at each corner on the bottom of the unit, and place the switcher in the desired location.

### Rack mounting

For optional rack mounting, do not install the rubber feet. Mount the switcher on any of the following rack shelves:

- **RSB 123** — 1U, 3.5" Deep VersaTools® Basic Rack Shelf (part #60-604-20)
- **RSF 123** — 1U, 3.5" Deep VersaTools Rack Shelf Kit (part #60-190-20)
- **RSB 126** — 1U, 6" Deep Basic Rack Shelf (part #60-604-10)
- **RSU 126** — 1U, 6" Deep Universal Rack Shelf Kit (part #60-190-10)
- **RSB 129** — 1U, 9.5" Deep Basic Rack Shelf (part #60-604-01)
- **RSU 129** — 1U, 9.5" Deep Universal Rack Shelf Kit (part #60-190-01)

### UL rack mounting guidelines

The following Underwriters Laboratories (UL) guidelines pertain to the safe installation of the equipment in a rack.

1. **Elevated operating ambient temperature** — If the equipment is installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the equipment in an environment compatible with the maximum ambient temperature ( $T_{ma} = +122\text{ }^{\circ}\text{F}$ ,  $+50\text{ }^{\circ}\text{C}$ ) specified by Extron.
2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — When mounting the equipment in the rack, ensure that uneven mechanical loading does not cause a hazardous condition.
4. **Circuit overloading** — When connecting the equipment to the supply circuit, consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Consider equipment nameplate ratings when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

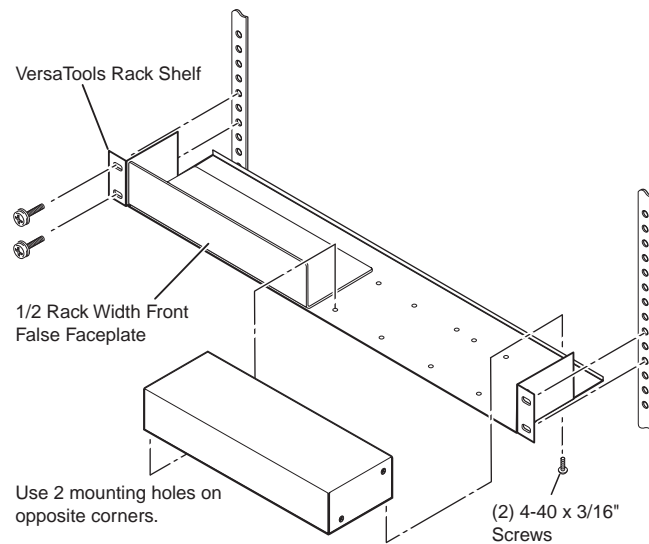
## Installation, cont'd

---

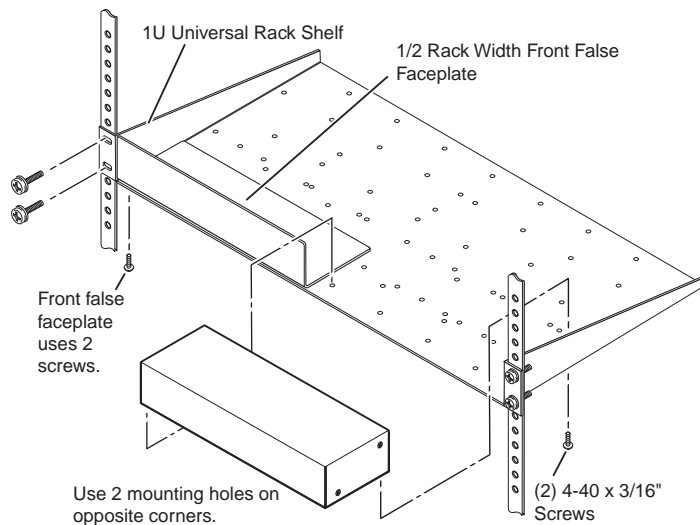
### Rack mounting procedure

1. If feet were previously attached to the bottom of the switcher, remove them.
2. Mount the SW USB Series switcher on the rack shelf, using two 4-40 x 3/16 inch screws in opposite (diagonal) corners to secure the unit to the shelf (see the illustrations on the next page).
3. Install blank panel(s) or other unit(s) on the rack shelf as desired.
4. Install the shelf in the rack.

The following illustrations show examples of how the SW USB can be mounted on different sized rack shelves.



### ***Mounting an SW USB switcher on a 3.5-inch deep VersaTools rack shelf***



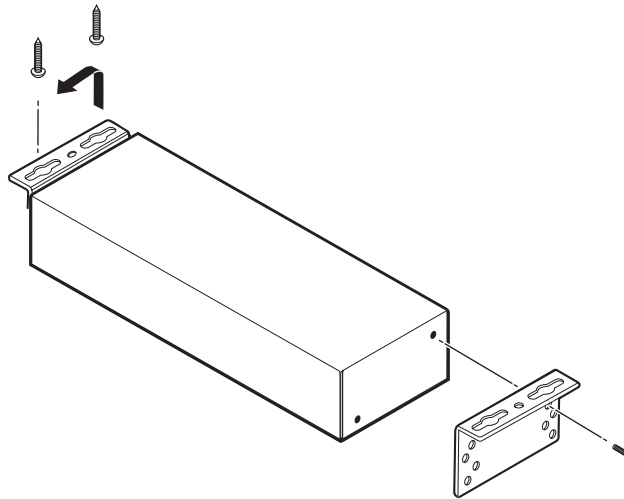
### ***Mounting an SW USB switcher on a standard 9.5-inch deep rack shelf***

---

## Furniture mounting

To mount the SW USB switcher under a desk, table, or podium, use the optional MBU 123 VersaTools Mini Under-Desk Mounting Kit (part #70-212-01), as follows:

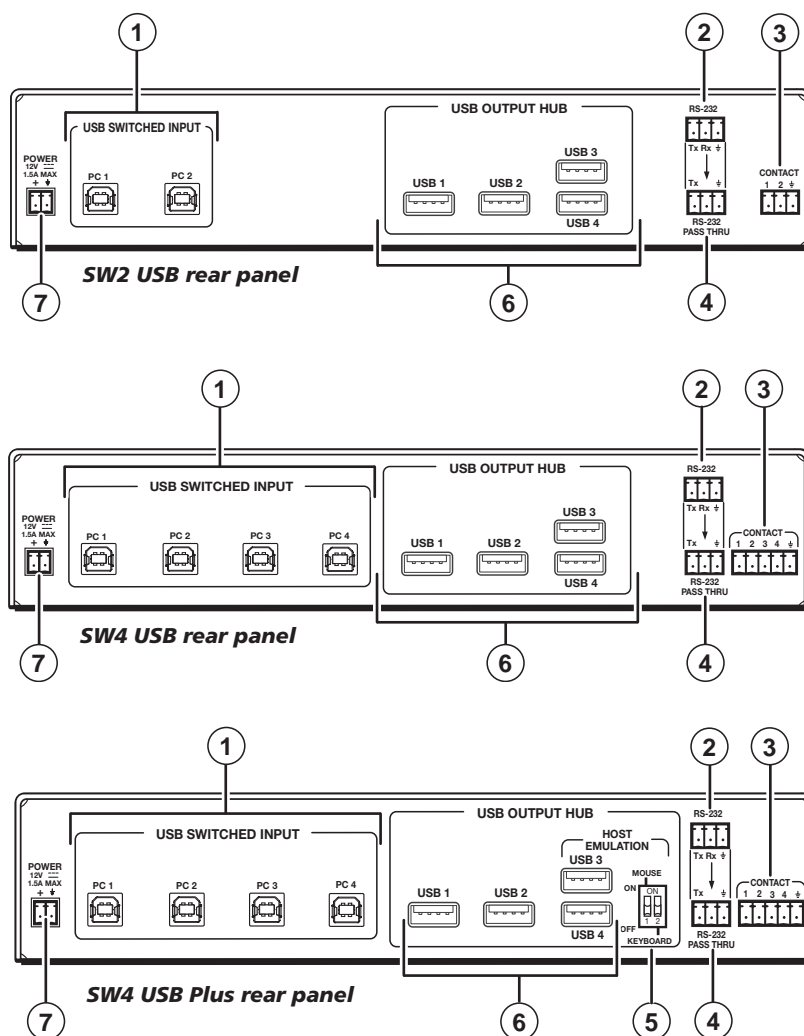
1. If rubber feet were previously attached to the bottom of the unit, remove them.
2. Remove the two screws from one side of the SW USB. Retain the screws for possible later reassembly.
3. Attach the brackets to the sides of the unit, using the provided machine screws. (See the illustration below.)
4. Hold the unit with the attached brackets against the underside of the table or other furniture. On the mounting surface, mark the location of the brackets' screw holes.
5. Drill 3/32 inch (2 mm) diameter pilot holes, 1/4 inch (6.3 mm) deep, into the mounting surface at the marked screw locations.
6. Insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until slightly less than 1/4 inch of the screw head protrudes.
7. Align the mounting screws with the slots in the brackets and place the unit against the surface, with the screws through the bracket slots.



### ***Mounting the SW USB under furniture mounting***

8. Slide the unit slightly forward or back, then tighten all four screws to secure it in place.

## Rear Panel Features



- ① **Input connectors** — Connect host devices, such as computers, to these female type B USB connectors, using cable lengths of up to 15 feet (4.5 m). Pinouts for these connectors follow the standard pinout as defined in USB standards.
- ② **RS-232 port** — Connect a host computer or control system to this three-pole, 3.5 mm captive screw connector for RS-232 control and status feedback (see [“Wiring for RS-232 Communication”](#), later in this chapter). The SW USB can be controlled via Extron’s Simple Instruction Set (SIS™) commands. This port can also be used to update firmware.

**NOTE** Your RS-232 computer or control system should not be one of the host devices connected to the input ports. Use a separate computer for RS-232 communication.

- ③ **Contact port** — If desired, connect a two- or four-button contact closure device to this 3-pole (SW2) or 5-pole (SW4), 3.5 mm captive screw connector to enable input selection via contact closure (see [“Contact Closure Control”](#), later in this chapter).



- 
- ④ **RS-232 Pass Thru port** — If desired, connect an Extron A/V switcher to this 3-pole, 3.5 mm connector (see “[RS-232 Pass Thru port](#)”, later in this chapter). Commands issued via the front panel, contact closure, or an RS-232 interface on a PC or control system can be sent through this port to the connected switcher.

**NOTE** *Only Extron products can be controlled via this port.*

- ⑤ **Emulation DIP switches** — (SW4 USB Plus only) These DIP switches enable host emulation to a keyboard and/or mouse connected to output ports 3 and 4. Switch 1 enables host emulation to a mouse; switch 2 enables emulation to a keyboard.

When a keyboard or a mouse is connected to port 3 or 4, and the appropriate switch is set to On, the SW USB switches to the connected keyboard or mouse instantly, without the delay that normally occurs while the computer recognizes a new peripheral device.

- ⑥ **Output connectors** — Connect peripheral USB devices, such as keyboards and/or mice, storage drives, or webcams, to these female type A USB connectors, using cable in lengths of up to 15 feet (4.5 m). All outputs supply the 500 mA, 5 V rating as defined in USB standards.

**NOTE** *If your SW USB system contains multiple computers, drivers for all connected peripheral devices should be loaded on all computers.*

**NOTE** *The four outputs act as a USB hub. Inputs cannot be routed to specific USB output connectors. All outputs are simultaneously connected to the selected input.*

**NOTE** *On the SW USB Plus, output ports 3 and 4 can be used for host emulation (with supported keyboards and mice only). See “[Host emulation \(SW4 USB Plus only\)](#)” in chapter 3 for more information.*

- ⑦ **Power connector** — Attach the provided external 12 VDC power supply to this two-pole, 3.5 mm captive screw connector (see “[Wiring the Power Connector](#)” in the next section).

## Installation, cont'd

### Wiring the Power Connector

If using a different external power supply from the one provided with the SW USB, you may need to wire the connector for it.

To wire the power connector,

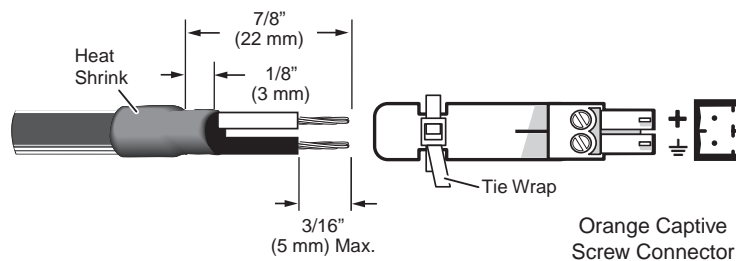
1. Cut the power supply's DC output cord to the length needed.
2. Strip the jacket to expose 3/16 inch (5 mm) of the conductors.

**CAUTION** Exposing more than 3/16 inch (5 mm) of the copper wires could allow the stripped wires to touch each other, causing a short circuit. This could result in the external DC power supply overheating and/or burning.

*Exposing less than the recommended amount may cause the wires to slide out of the connector too easily, even if they are tightly pinched by the captive screws.*

3. Slide the exposed leads into a two-pin captive screw plug and secure them by tightening the screws, using a small screwdriver.
4. To verify the power cord's polarity before connecting it, plug in the power supply with no load and check the output with a voltmeter.
5. Use the supplied tie-wrap to strap the power cord to the extended tail of the connector.

The figure below shows how to wire the power connector.



#### Power connector wiring

**WARNING** The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.

**CAUTION** Do not tin the stripped power supply leads before attaching the captive screw plug to them. Tinned wires are not secure in the captive screw connectors and can be easily pulled out. They may also break after being bent several times.

---

## Wiring for RS-232 Communication

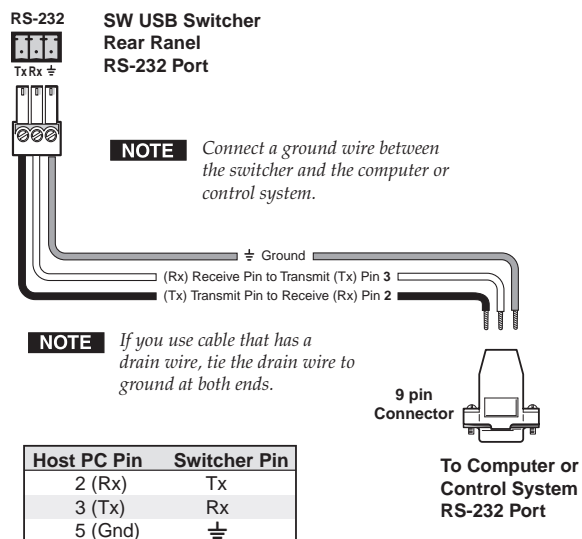
### RS-232 port

The 3-pole, 3.5 mm captive screw connector labeled “RS-232” is used for optional RS-232 communication between the SW USB and a PC or control system. The control system plugged into this port can issue commands to the SW USB, which can pass the commands through to an Extron A/V switcher that is plugged into the RS-232 Pass Thru port.

**NOTE** Your RS-232 computer or control system should not be one of the host devices that are being switched. Use a separate computer for RS-232 control.

To connect your computer or control system to the RS-232 connector, use a female 9-pin D-to-bare-wire RS-232 cable, such as the Extron UC50 cable.

1. Wire the unterminated end of the RS-232 cable to one of the provided 3-pin captive screw plugs.
2. Plug the wired 3-pin connector into the RS-232 receptacle on the switcher’s rear panel.



### Wiring the RS-232 connector

## Installation, cont'd

### RS-232 Pass Thru port

The RS-232 Pass Thru port loops the signal received at the switcher's RS-232 control port, the Contact (closure) port, or the front panel input buttons through the RS-232 Pass Thru port to send SIS commands to another Extron A/V switcher.

**NOTE** Only Extron products can be controlled via this port.

You can configure the SW USB to send commands through the RS-232 Pass Thru port to the A/V switcher in two loop modes:

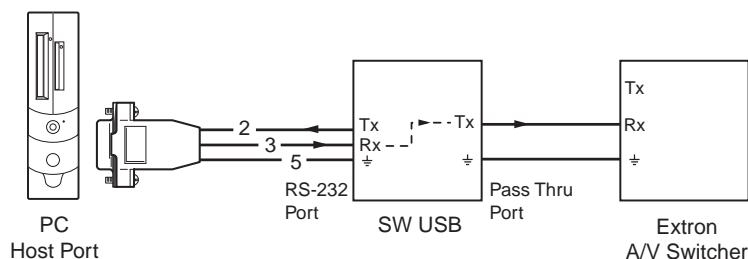
- **Loop 1 mode** — The SW USB passes through only SIS commands received via your computer's RS-232 interface. (See "[SIS command processing](#)" in chapter 3, "Operation", for information on SIS commands that are supported with the loop-through feature.)
- **Loop 0 mode (default)** — The SW USB passes through SIS commands sent from the computer's RS-232 interface (loop 1 mode) plus input selections made via contact closure or the front panel buttons.

**NOTE** In Loop 0 mode, you can still issue commands **to the SW USB** using the front panel buttons, RS-232, or contact closure in both loop modes. The loop mode selection affects only commands coming through the RS-232 Pass Thru port.

**NOTE** See "[Issuing commands to an Extron A/V switcher via the RS-232 Pass Thru port](#)" in chapter 3 for more information on the loop modes and commands.

See chapter 4, "[SIS Programming and Control](#)", for explanations of the available SIS commands.

The diagram below shows how to wire the SW USB's RS-232 Pass Thru port for use with an Extron A/V switcher. The RS-232 Pass Thru port does not have a receive pin; therefore, it does not receive responses from the connected A/V switcher.



### Connections for RS-232 loop-through

---

## Contact Closure Control

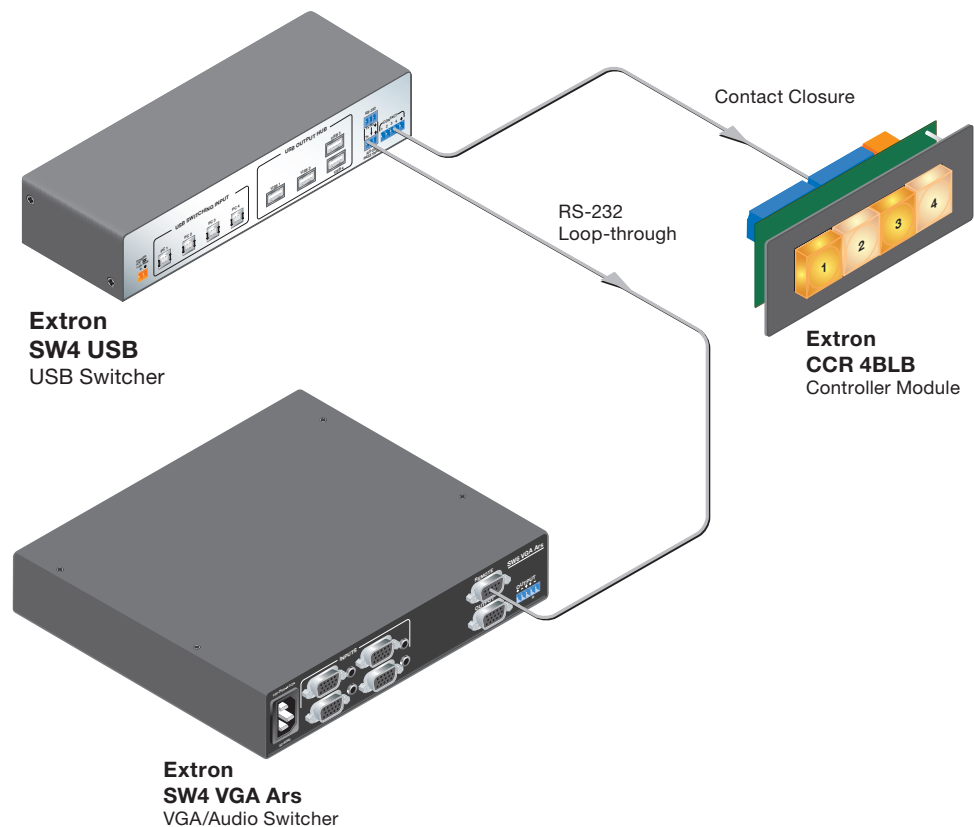
Contact closure is another method of input selection. To enable input selection by contact closure, you can connect a push-button contact closure device (such as an Extron CCR 2BLB, CCR 4BLB, or CCR 204) to the SW USB's Contact port.

Alternatively, you can manually short one of the pins to ground (the ground [≡] pin is pin 3 for SW2 and pin 5 for SW4 models). Pin 1 selects input 1, pin 2 selects input 2, and so forth.

### Controlling an Extron A/V switcher (Loop 0 mode)

For applications in which the SW USB is connected to an Extron A/V switcher that can be controlled via RS-232, inputs can be selected on both switchers by contact closure, as well as by the SW USB front panel buttons and via the RS-232 interface.

To select inputs on the A/V switcher using contact closure, place the SW USB in Loop 0 mode. Then, when you press a button on the contact closure device or jumper-connect the ≡ pin with one of the other pins in the Contact connector, the SW USB sends an input selection SIS command (X1!, where X1 is the input number) through the RS-232 Pass Thru port to the A/V switcher, causing it to switch inputs.



### Using the SW USB with a contact closure device and an A/V switcher

To set up for contact closure control of an A/V switcher,

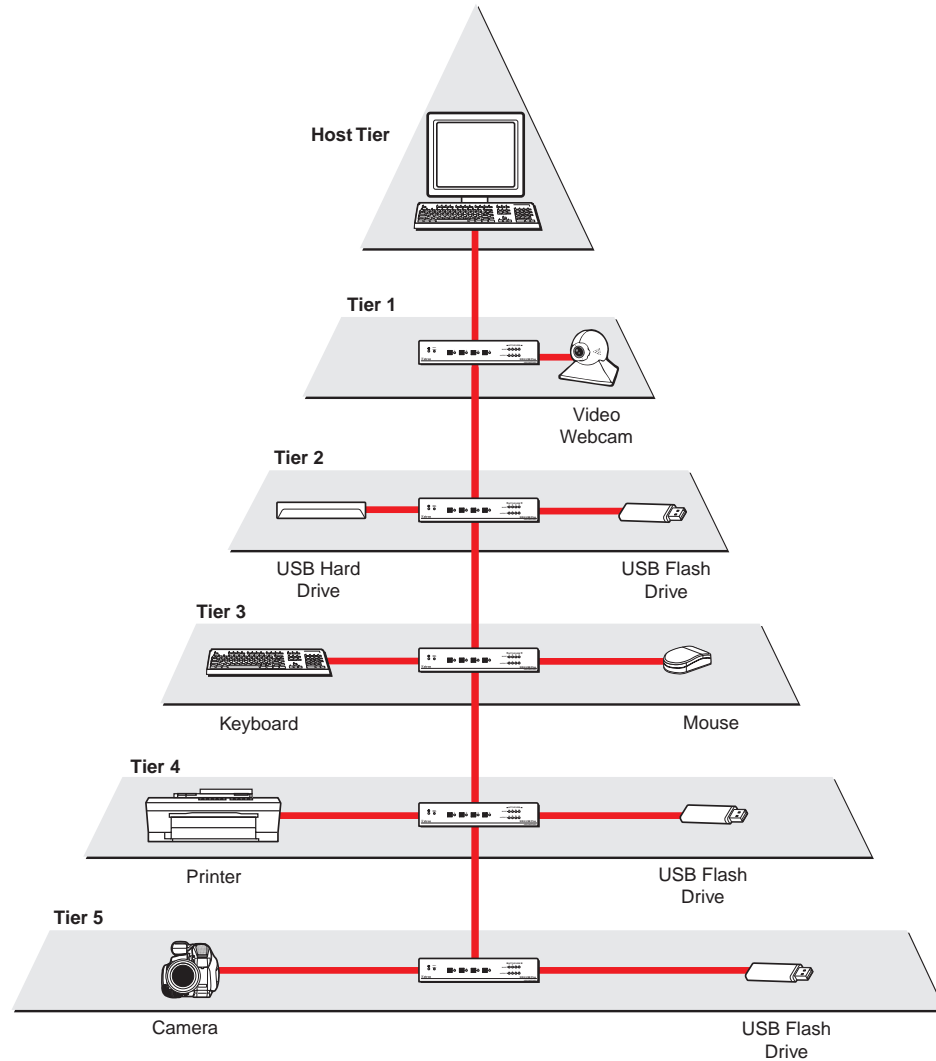
1. If desired, connect a contact closure device to the SW USB's Contact port.
2. Connect the SW USB's RS-232 Pass Thru port to the A/V switcher's RS-232 port.
3. Issue the SIS command `[Esc] 0LOOP←` to the SW USB to enable Loop 0 mode.

## Installation, cont'd

### Connecting Multiple SW USBs in a System

The USB specification states that a maximum of five hubs can be connected in a series; therefore, no more than five SW USBs can be cascaded in a series.

**NOTE** Do not exceed five cascaded hubs and a total of 127 peripheral devices in the entire system.



**Example of a single host with the maximum of five SW USB switchers cascaded in a series**



**SW USB Series**

# Chapter Three

## Operation

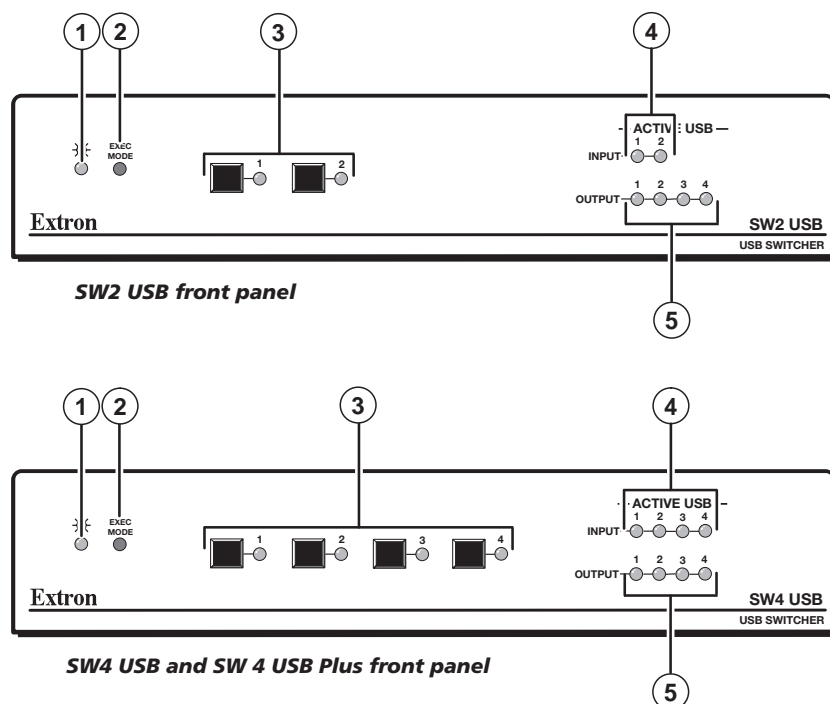
Front Panel Features

Operations

Updating Firmware

# Operation

## Front Panel Features



- ① **Power LED** — This LED lights when the SW USB has power.
- ② **Exec Mode LED** — This LED lights when the SW USB is in executive mode, indicating that the front panel is locked and input selections cannot be made from it.
- ③ **Input Selection buttons and LEDs** — Press these buttons to select inputs 1 and 2 (SW2) or 1 through 4 (SW4 and SW4 Plus). The LED at the right of each button lights when the corresponding input has been selected. These buttons also can be used to initiate executive mode and to reset the unit. See [“Enabling front panel lockout \(executive mode\)”](#) and [“Resetting”](#), later in this chapter.

### Active USB (port status) LEDs:

- ④ **Input LEDs** — Each of these LEDs lights when a host or PC is connected to the switcher’s corresponding USB input port and is detected by the SW USB, whether or not the input is selected.
- ⑤ **Output LEDs** — Each of these LEDs lights when a peripheral device is connected to the switcher’s corresponding output port and has been enabled by the selected input device or host PC.

## Operations

### Powering on the system

To power on the SW USB and connected devices,

1. Connect all input and output devices to the switcher’s rear panel connectors. If desired, connect a host PC to the RS-232 port. (See [“Rear Panel Features”](#) in chapter 2, “Installation”, for information on the rear panel connections.)



- 
2. Plug the power supply into the two-pole captive screw power connector on the rear panel.

The unit performs a self-test, during which the Exec Mode LED and the front panel Input LEDs each blink once in sequence from left to right. If the self-test completes with no errors, the LED for the most recently selected input remains lit.

3. Select input 1 and power up the PC connected to it.
4. Select each desired remaining input and power up the PC connected to it.

## Selecting an input

SW USB inputs can be selected by using

- The front panel buttons
- Contact closure
- SIS commands
- Keyboard (“hot key switching” — SW4 USB Plus only)

### Selecting an input from the front panel

To select an input from the front panel, press the desired input’s button. The LED adjacent to the selected input button lights.

After an input is selected, the LED remains lit until a new input is selected.

### Selecting an input using contact closure

Use one of the following methods to select an input via contact closure:

- **Using a contact closure device:** If a two- or four-button contact closure device is connected to the SW USB’s Contact port, press the button on the device that corresponds to the SW USB input that you want to select. The first button on the left selects input 1, the second button selects input 2, and so forth.
- **Using a jumper wire:** On the Contact port, use a jumper wire to connect the ground ( $\oplus$ ) port to the port with the desired input number (1, 2, 3, or 4). See [“Contact Closure Control”](#) in chapter 2, “Installation” for more information.
- **Using an IR 102:** Refer to the *IR 102 User’s Manual* for this procedure.

### Selecting an input using SIS commands

You can also select an input via an RS-232 connection using SIS commands. See chapter 4, [“SIS™ Programming and Control,”](#) for a list of available SIS commands and their explanations.

If an Extron A/V switcher is connected to the RS-232 Pass Thru port, the SIS commands that you enter can also be passed through to the connected switcher, even if the connected switcher has more inputs than the SW USB (see the next section).

### Selecting an input using the keyboard (SW4 USB Plus only)

When a keyboard is connected to an emulation port and the keyboard emulation DIP switch (switch 2) is set to On, you can switch to a desired input by pressing Ctrl + Shift + *input number*. (For example, to switch to input 3, press Ctrl + Shift + 3.)

See [“Host Emulation \(SW4 USB Plus only\)”](#), later in this chapter, for information on setting up the SW4 USB Plus for host emulation.

### Issuing commands to an Extron A/V switcher via the RS-232 Pass Thru port

To configure the SW USB to pass commands through the RS-232 Pass Thru port to a connected A/V switcher, you must select a loop mode. The loop mode determines which types of commands are passed through this port.

The two loop modes are:

- **Loop 1 mode** — In this mode, SIS commands sent to the SW USB via an RS-232 interface are passed through the RS-232 Pass Thru port to the A/V switcher. The RS-232 interface is the **only** method of issuing commands to the A/V switcher.
- **Loop 0 mode (default)** — In this mode, in addition to passing through SIS commands sent from the computer's RS-232 interface, the SW USB also passes input selections entered via contact closure or the front panel buttons through the RS-232 Pass Thru port to the A/V switcher.

#### Selecting the loop mode

To select the loop mode, enter one of these Loop commands:

- **Loop 1 mode:** `[Esc] 1LOOP ←`
- **Loop 0 mode:** `[Esc] 0LOOP ←` command.

The table below summarizes the two loop modes.

Mode	SIS command	Commands sent to A/V switcher through SW USB Pass Thru port
<b>Loop 1</b>	<code>[Esc] 1LOOP ←</code>	Only SIS commands received via the RS-232 control port are passed through the RS-232 Pass Thru port.
<b>Loop 0 (default mode)</b>	<code>[Esc] 0LOOP ←</code>	Both of the following are available: <ul style="list-style-type: none"><li>• Input selection via contact closure and front panel buttons</li><li>• SIS commands sent via RS-232 interface (loop 1 functionality)</li></ul>

See the [command/response table](#) in chapter 4 for an explanation of all supported SIS commands.

**NOTE** *In Loop 0 mode, you can still issue commands to the SW USB using the front panel buttons, RS-232, or contact closure in both loop modes. The loop mode selection affects only commands coming through the RS-232 Pass Thru port.*

#### SIS command processing

When an A/V switcher is connected to the RS-232 Pass Thru port, SIS commands are processed in one of the following ways:

- Passed through to the A/V switcher **without** being acted on by the SW USB
- Performed by the SW USB and **not** passed through to the A/V switcher
- Performed by the SW USB and passed to the A/V switcher, which also performs them. This applies only to the input selection command `[X]!`, where `[X]` is the input number.

The table on the next page shows how the SIS commands are handled by an SW USB with a connected A/V switcher. (Unless otherwise indicated, commands are **not** case-sensitive.)

SIS Command	SW USB function	SW USB response to host
!	Performed and passed through	Chn <b>X1</b> ↵
^	Performed, not passed through	Usb <b>X1</b> ↵
<b>Esc</b> (any)	Performed, not passed through	See the SIS command table.
X	Performed, not passed through	<b>X3</b> ↵
N	Performed, not passed through	60-95n-01 ↵
Q	Performed, not passed through	n.nn ↵
*Q	Performed, not passed through	n.nn.nnnn ↵
I	Performed, not passed through	Chn <b>X1</b> •InACT <b>X4</b> OutACT <b>X4</b> ↵
0V – 100V	Passed through, not performed*	CMD ↵
&	Passed through, not performed*	CMD ↵
%	Passed through, not performed*	CMD ↵
1B, 0B	Passed through, not performed*	CMD ↵
1M, 0M	Passed through, not performed*	CMD ↵
1Z, 0Z	Passed through, not performed*	CMD ↵
\$	Passed through, not performed*	CMD ↵

\* For explanations of commands that are passed through to the A/V switcher and **not** performed by the SW USB, refer to your A/V switcher's user's manual.

**Example:** When a control system issues an SIS input selection command of 1! (Select input 1), 2! (Select input 2), 3! (Select input 3), or 4! (Select input 4), the SW USB switches to the corresponding input. In addition, the SW USB passes the SIS input selection command through the RS-232 Pass Thru port, causing the same input to be selected on the A/V switcher.

### Commands that cannot be passed through

The following SIS commands **cannot** be passed through to the A/V switcher:

- **Information requests:** View part number (N), Request information (I), and Query firmware version (Q)
- **Change loop mode** (**Esc** nLOOP)
- **Upload firmware** (**Esc** Upload)

See the “[Command/response Table for SIS Commands](#)” in chapter 4 for explanations of SIS commands that are performed by the SW USB.

### Sending commands to an A/V switcher using contact closure

In Loop 0 mode, you can select an input on the SW USB by shorting the equivalent pin on the Contact port to ground (either by pressing a button on a connected contact closure device or by connecting a jumper between pin 1, 2, 3, or 4 and  $\equiv$  [ground]). Shorting the pin to ground issues an input selection command to the SW USB, which passes an SIS input selection command through its RS-232 Pass Thru port to the A/V switcher. The switcher then switches to the corresponding input.

**Example:** If you want to select input 1 on the A/V switcher, short pin 1 to ground on the SW USB Contact port. The SW USB switches to input 1 and, simultaneously, the RS-232 Pass Thru port passes the SIS command 1! to the A/V switcher, which also switches to input 1.

## Operation, cont'd

The following table shows the SIS commands that are issued when inputs are selected by contact closure:

Contact closure selection	SIS command sent via RS-232 Pass Thru	Function on the A/V switcher
Pin 1 to $\perp$	1!	Select input 1
Pin 2 to $\perp$	2!	Select input 2
Pin 3 to $\perp$	3!	Select input 3
Pin 4 to $\perp$	4!	Select input 4

### Enabling front panel lockout (executive mode)

Executive mode disables all front panel controls, locking out the user from those functions. Putting the switcher in this mode enhances security by protecting against inappropriate or accidental changes to settings. When the SW USB is in executive mode, RS-232 and contact closure remain available.

To lock the front panel, see the illustration below.



### Setting executive mode

To exit executive mode, repeat the procedure described above. When the SW USB is no longer in executive mode, the red LED turns off.

### Resetting

To reset the switcher to its factory default settings from the front panel,

1. Disconnect power from the SW USB.
2. Press and hold the Input 1 button while applying power to the unit.

The Input LEDs blink three times to indicate that a reset has occurred. The input selection defaults to input 1, and the Input 1 LED lights.

### Host emulation (SW4 USB Plus only)

The SW4 USB Plus model provides host emulation to peripheral devices on the output of the switcher. If a keyboard, mouse, or both are connected to output port 3 or 4, and the Host Emulation DIP switch(es) are set to On, the SW USB emulates a host PC to the connected peripheral device. The keyboard or mouse connected to the switcher's port 3 or 4 still responds as if it were attached directly to the computer on the selected input.

Host emulation allows instant communication of the emulated ports when the SW USB switches to another input, by eliminating the delay that normally occurs when a computer recognizes a new device.

---

## Setting up for host emulation

To enable host emulation,

1. Connect a keyboard, a mouse, or both to output port 3, 4, or both. The SW4 USB Plus can emulate a keyboard and a mouse simultaneously. Either type of device can be connected to either or both of the two emulation ports (3 and 4).

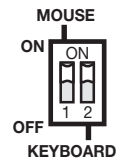
**NOTE** *The SW USB cannot emulate a host through ports 3 and 4 if a hub or an extender with an internal hub is connected to either of these ports.*

2. Place the Host Emulation DIP switches on the rear panel in the appropriate position to enable emulation for the connected device. The table below shows the switch positions for keyboard and mouse emulation.

Switch 1 (Mouse)	Switch 2 (Keyboard)	Emulation
Off (down)	Off (down)	No emulation
On (up)	Off (down)	Emulate mouse only.
Off (down)	On (up)	Emulate keyboard only.
On (up)	On (up)	Emulate keyboard and mouse.

**Example:** In the illustration at right, the DIP switches are set to enable emulation of both a mouse and a keyboard.

**NOTE** *If two mice or two keyboards are connected to output ports 3 and 4, and the appropriate emulation DIP switch is set to On, the switcher emulates a host to only one port.*



When one or both DIP switches are set to On (up), host emulation follows the attached peripheral device:

- When the Mouse DIP switch (switch 1) is set to On (up), the switcher emulates a host to any standard mouse that is connected to either of the emulation output ports (3 or 4).
- When the Keyboard DIP switch (switch 2) is set to On, the switcher emulates a host to any standard keyboard that is connected to an emulation port.
- When both DIP switches are set to On, the switcher emulates a host to any connected standard mouse or keyboard that is connected to port 3 or 4.

## Supported peripheral devices

The SW4 USB Plus can emulate a host only to a standard keyboard and a standard mouse. The emulation feature is **not** supported with non-standard keyboards or mice, such as devices that require additional drivers.

For example, the SW USB does not support host emulation for RF/Bluetooth keyboards and mice, hubs, extenders with internal hubs, or any peripherals connected to those types of devices. If these devices are connected to output ports 3 and 4 when the DIP switches are set to On, the devices are switched through to the input.

Alternatively, you can set the Host Emulation DIP switches to Off when using these devices.

### Troubleshooting

If the SW USB detects a non-standard keyboard or mouse, an error condition may occur in which the Exec Mode LED blinks and the SW USB reboots in a repeating cycle. If this happens, and rebooting does not resolve the issue, set the host emulation DIP switch(es) to Off, and then wait for the switcher to reboot. You will not be able to use host emulation with that keyboard or mouse.

### Peripheral emulation (SW4 USB Plus only)

In addition, the SW4 USB Plus emulates a mouse and keyboard to the computer or other input device that is connected to the selected input port. This emulation of peripheral devices is constant, whether or not a keyboard or mouse is actually connected to these ports, facilitating problem-free boot-up. Keyboard and mouse emulation is always present on the inputs of the switcher.

### Updating Firmware

Extron periodically updates product firmware in conjunction with the release of new software revisions. Before updating any Extron product to the latest revision level, be sure to read the supplied release notes or contact Extron Technical Support to determine if your product requires a firmware update.

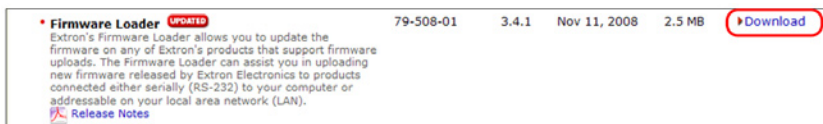
You can find out what version of firmware is currently loaded on your switcher by entering the SIS "Q" command via the RS-232 interface (see the [Query firmware version](#) command in chapter 4, "SIS™ Configuration and Control").

New firmware versions for the SW USB can be downloaded from the Extron Web page. After you install the new firmware on your computer, you can upload it to the switcher using either SIS commands (see the "[Command/response Table for SIS Commands](#)," in chapter 4) or the Firmware Loader software (see "[Loading the firmware to the switcher using Firmware Loader](#)", later in this chapter).

### Downloading and installing the Firmware Loader

Extron recommends using the Firmware Loader software to update the firmware on the SW USB. If you do not already have the Firmware Loader software installed on your computer, download it as follows:

1. Go to the Extron Web site at [www.extron.com](http://www.extron.com) and click the **Download** tab.
2. On the Download Center screen, click the **Software** link on the left sidebar menu.
3. On the next Download Center screen, locate and click the **Download** link for the Firmware Loader.



4. On the next screen, enter the requested information, then click the **Download fw\_loader $n$ x $n$ .exe** button (where  $n$  is the Firmware Loader version number).
5. Follow the instructions on the rest of the download screens to save the executable Firmware Loader installer file to your computer. Note the folder to which you saved the file.

6. In Windows Explorer or another file browser, locate the downloaded executable installer file and double-click it to open it.
7. Follow the instructions on the Installation Wizard screens to install the Firmware Loader on your computer. Unless you specify otherwise, the installer program places the Firmware Loader file, "FWLoader.exe", at c:\Program Files\Extron\FWLoader.

## Downloading and installing the SW USB firmware

To obtain the latest version of SW USB firmware and install it on your computer,

1. Go to the Extron Web site at [www.extron.com](http://www.extron.com) and click the **Download** tab.
2. On the Download Center screen, click the **Firmware** link on the left sidebar menu.



3. On the next Download Center screen, locate and click the **Download** link for the SW USB Series. (You may need to click the **Next** link at the bottom of the page to display additional download pages.)



### SW-USB firmware link on the download page

4. On the next screen, enter the requested information, then click the **Download** button.
5. Follow the instructions on the rest of the download screens to save the executable firmware installer file to your computer. Note the folder to which you saved the file.
6. In Windows Explorer or another file browser, locate the downloaded executable file and double-click it to open it.
7. Follow the instructions on the Installation Wizard screens to install the new firmware on your computer. Unless you specify otherwise, the installer program places the installed firmware file, "SWUSB\_vnxxm.s19", at c:\Program Files\Extron\Firmware.

A Release Notes file, giving information on what has changed in the new firmware version, and a set of instructions for updating the firmware are also loaded.



### Loading the firmware to the SW USB using the Firmware Loader

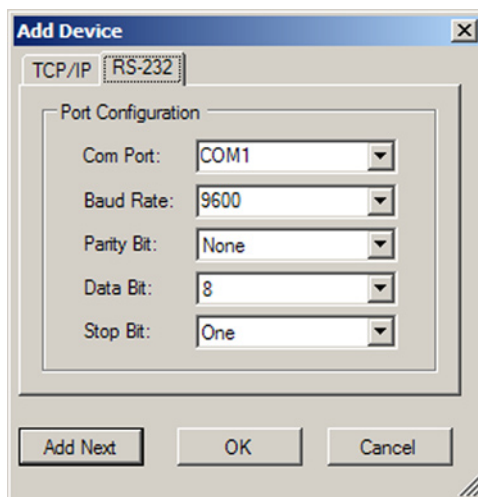
To load a new version of firmware from your computer to your SW USB using the Extron Firmware Loader software, your computer's serial port must be connected to the switcher's RS-232 serial port. See "[Rear Panel Features](#)," in chapter 2, "Installation," for information on connecting to the serial port.

1. If you have not already done so, download and install the Firmware Loader executable installer file to your computer (see "[Downloading and installing the Firmware Loader](#)," earlier in this chapter).
2. If necessary, download the latest SW USB firmware version and install it on your computer (see "[Downloading and installing the SW USB firmware](#)," on the previous page).
3. Open the Firmware Loader via your desktop Start menu by making the following selections:

**Start > All Programs > Extron Electronics > Firmware Loader > Firmware Loader**

The Firmware Loader window opens to full screen size, with the Add Device window displayed in front of it.

4. On the Add Device window, select the **RS-232** tab.



**Add Device window RS-232 tab**

**NOTE** Although the screen also has a **TCP/IP** tab, the SW USB does not have a LAN port. Do not select the **TCP/IP** tab.

5. From the drop-down menus, select the appropriate port configuration parameters (obtained from your system administrator). The defaults are shown in the illustration above (9600 baud, no parity, 8 data bits, and one Stop bit).
6. If you want to upload the firmware to additional device(s),
  - a. Click **Add Next**. Your first device is added to the Devices field in Firmware Loader window, and the Add Device window remains open.
  - b. Enter the connection information for the next device.
  - c. Repeat steps **a** and **b** until all desired devices have been added to the Firmware Loader window.

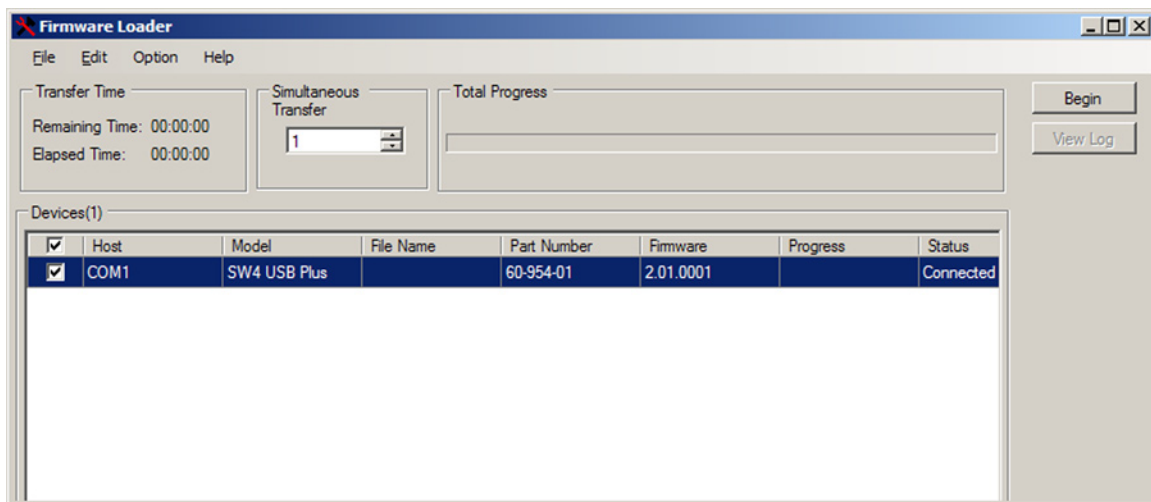


To remove a device from the Devices field,

- a. Click on the names of the device(s) to be deleted, to highlight them.
- b. Select **Remove Selected Device(s)** from the Edit menu.
- c. On the Remove Device(s) window, select or deselect any devices on the list as desired, then click Remove.

To remove all devices from the Devices field, select **Remove All Devices** from the Edit menu.

7. When finished adding devices, click **OK**. The Add Device window closes, leaving the Firmware Loader window open with the added SW USB(s) highlighted and selected.

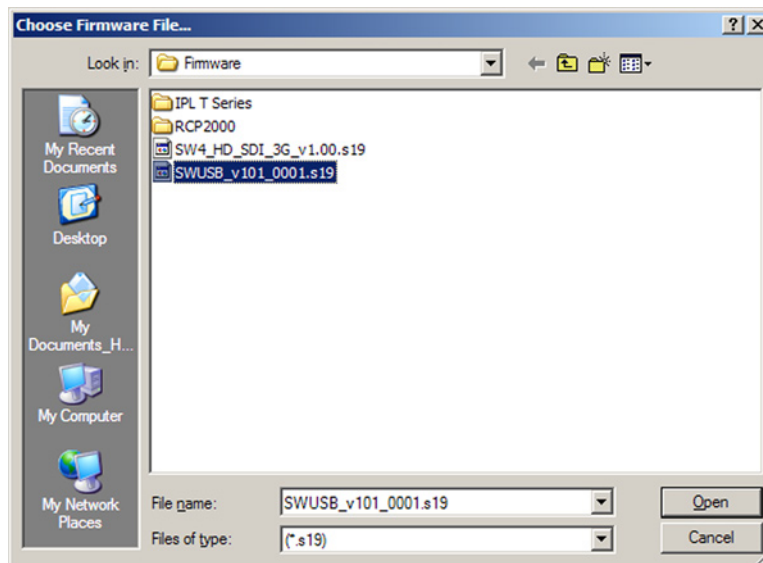


***Firmware Loader screen with an SW USB added***

8. From the File menu on the Firmware Loader window, select **Open**.
9. In the Choose File window that opens, browse to locate the firmware file to be uploaded and double-click it to open it. **The file extension must be .S19.**

**CAUTION** *Uploading a file with an incorrect extension may cause the unit to stop functioning.*

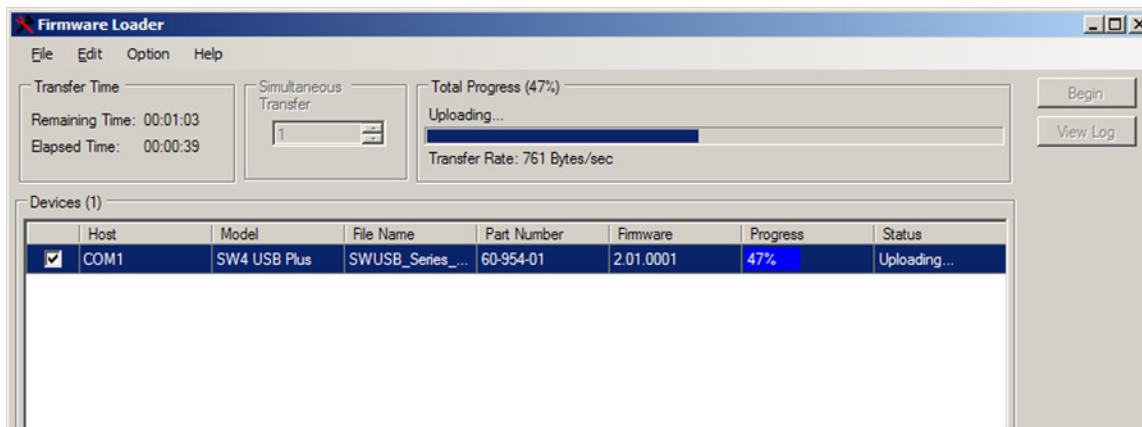
## Operation, cont'd



### ***Choose file window with firmware file selected***

The Choose File window closes. The device model and firmware file names are now displayed on the Firmware Loader window.

10. Click the **Begin** button in the upper-right corner to start the firmware uploading process. While the firmware is being updated, a progress bar shows the status of the upload, while the Transfer Time field displays the time elapsed and the time remaining in the process. In addition, the percent of the file that has been uploaded is displayed highlighted in the Progress column until the entire firmware file is uploaded.



### ***Firmware upload in progress***

11. When the firmware update is finished, "Completed" appears above the progress bar in the Total Progress field. The Progress field displays "100%" and the Status field displays "Completed". Close the Firmware Loader window.



**SW USB Series**

# 4

## **Chapter Four**

### **SIS Programming and Control**

Host-to-Switcher Communications

Using Simple Instruction Set (SIS™) Commands

# SIS™ Programming and Control

The SW USB can be remotely set up and controlled via a host computer or other device (such as a control system) that is attached to the rear panel RS-232 port. (See “Wiring for RS-232 Communication” in chapter 2, “Installation”, for information on connecting to this port.) You can issue Simple Instruction Set (SIS™) commands to the switcher using your computer’s RS-232 interface with a communication software program such as HyperTerminal or Extron DataViewer.

## Host-to-Switcher Communications

SIS commands consist of one or more characters per field. No special characters are required to begin or end a command sequence. When the switcher determines that a command is valid, it executes the command and sends a response to the host device.

Most responses from the SW USB to the host computer end with a carriage return and a line feed (CR/LF =  $\leftarrow$ ), which signals the end of the response character string. A string is one or more characters.

## Switcher-initiated messages

When a local event such as a front panel selection takes place, the switcher responds by sending a message to the host, indicating what selection was entered. No response is required from the host.

The switcher sends the following copyright message when it first powers on.

(C) Copyright 2008, Extron Electronics SW $n$  USB Switcher Series, V $x.xx$

where  $n$  is the switcher model number as well as the number of inputs, and V $x.xx$  is the firmware version number.

**NOTE** This message is displayed only at power-up.

## Error responses

If the switcher is unable to execute a command it receives because the command is invalid or contains invalid parameters, the SW USB returns an error response to the host. Error response codes and their descriptions are:

E01 – Invalid input channel number (out of range)

E10 – Invalid command

E13 – Invalid value (out of range)

## Using the Command/Response Table

The command/response table on the following pages lists valid ASCII command codes, the switcher’s responses to the host, and a description of the command’s function or the results of executing the command. The ASCII to HEX conversion table below is for use with the command/response table.

ASCII to HEX Conversion Table																Esc	1B	CR	0D	LF	0A
20	!	21	“	22	#	23	\$	24	%	25	&	26	‘	27							
(	28	)	29	*	2A	+	2B	,	2C	-	2D	.	2E	/	2F						
0	30	1	31	2	32	3	33	4	34	5	35	6	36	7	37						
8	38	9	39	:	3A	;	3B	<	3C	=	3D	>	3E	?	3F						
@	40	A	41	B	42	C	43	D	44	E	45	F	46	G	47						
H	48	I	49	J	4A	K	4B	L	4C	M	4D	N	4E	O	4F						
P	50	Q	51	R	52	S	53	T	54	U	55	V	56	W	57						
X	58	Y	59	Z	5A	[	5B	\	5C	]	5D	^	5E	_	5F						
`	60	a	61	b	62	c	63	d	64	e	65	f	66	g	67						
h	68	i	69	j	6A	k	6B	l	6C	m	6D	n	6E	o	6F						
p	70	q	71	r	72	s	73	t	74	u	75	v	76	w	77						
x	78	y	79	z	7A	{	7B		7C	}	7D	~	7E	DEL	7F						

---

## Symbol definitions

- ↵ = CR/LF (carriage return/line feed) (hex 0D 0A)
- ← = Soft carriage return (no line feed)
- = Space
- Esc** = Escape key
- X1** = Input number: 0 through the maximum number of inputs (2 or 4)
  - 0 = all inputs disconnected
  - 1 = input 1
  - 2 = input 2
  - 3 = input 3
  - 4 = input 4
- X3** = On/off, signal, or front panel lock status
  - 0 = Off/signal not present
  - 1 = On/signal present
- X4** = **X3** **X3** **X3** **X3**  
The **X3**s represent inputs 1, 2, 3, and 4 in sequence.
- X5** = Position of the mouse emulation DIP switch (SW4 USB Plus only)
  - 0 = Mouse emulation off (DIP switch 1 is down.)
  - 1 = Mouse emulation on (DIP switch 1 is up.)
- X6** = Position of the keyboard emulation DIP switch (SW4 USB Plus only)
  - 0 = Keyboard emulation off (DIP switch 2 is down.)
  - 1 = Keyboard emulation on (DIP switch 2 is up.)

**NOTE** Unless otherwise indicated, commands are ***not*** case sensitive.

# SIS™ Programming and Control, cont'd

## Command/response table for SIS commands

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
<b>Input selection</b>			
Select input	[X1] !	Chn [X1] ↵	Select input [X1] for both the SW USB and the attached A/V switcher (if any). [X1] = 1, 2, 3, or 4.
Select SW USB input only	[X1] ^	Usb [X1] ↵	Select input [X1] on the SW USB only (not passed through).
<b>Configure RS-232 pass-through</b>			
Send SIS commands via computer RS-232 interface	[Esc] 1LOOP ↵	Loop1 ↵	Pass SIS commands through the RS-232 Pass Thru port to the A/V switcher <b>only</b> if the commands are sent to the SW USB via the computer's RS-232 interface.
Send input selection commands via contact closure, front panel, or the RS-232 interface	[Esc] 0LOOP ↵	Loop0 ↵	Pass all SIS commands sent from the computer's RS-232 interface, and <b>only</b> input selection commands sent via the front panel or contact closure, to the A/V switcher via the RS-232 Pass Thru port.
View loop-through setting	[Esc] LOOP ↵	Loop [X3] ↵	View pass-through setting [X3]. For [X3]: 0 = Loop 0 mode is enabled. 1 = Loop 1 mode is enabled.
<b>Front panel lockout (executive mode)</b>			
Enable executive mode	1X	Exe 1 ↵	Lock the front panel.
Disable executive mode	0X	Exe 0 ↵	Unlock the front panel.
Lockout status	X	[X3] ↵	Show executive mode on/off status. For [X3]: 1 = on, 0 = off
<b>Firmware version, part number, and information requests</b>			
Request information	I	Chn [X1] • InACT [X4] • OutACT [X4] • Emul [X5] [X6] ↵	Show the selected input and output. [X4] = Activity of all inputs and outputs <b>For SW USB Plus only:</b> [X5] = Mouse emulation switch position [X6] = Keyboard emulation switch position For [X5] and [X6]: 0 = off (down); 1 = on (up).
Request part number	N	60-95n-nn ↵	Show the SW USB part number. SW2 = 60-952-01, SW4 = 60-953-01, SW4 USB Plus = 60-954-01.
Query firmware version	Q	n.nn ↵	Show firmware version, expressed to the second decimal place.
Example:	Q	1.01 ↵	
Query version and build	*Q	n.nn.nnnn ↵	Show firmware version and build number.

---

Command	ASCII Command (host to unit)	Response (unit to host)	Additional description
<b>Reset</b>			
Reset	<b>[Esc]</b> ZXXX ←	Zpx ↵	Reset the switcher to factory default values.
<b>Upload firmware</b>			
Upload firmware	<b>[Esc]</b> Upload ←	...go ↵ Up1 ↵	Up1 appears after the upload is complete. (See “ <a href="#">Updating Firmware</a> ” in chapter 3 for information on the firmware updating process.)







**SW USB Series**

# Appendix A

## **Specifications, Part Numbers, and Accessories**

Specifications

Included Parts

Accessories

# Specifications, Part Numbers, and Accessories

---

## Specifications

### USB

USB specification.....	USB 2.0 compatible
USB data rates.....	Low speed (1.5 Mbps)
	Full speed (12 Mbps)
	High speed (480 Mbps)

### USB input

Connectors	
SW2 USB.....	2 female USB type B
SW4 USB, SW4 USB Plus .	4 female USB type B

### USB output

Connectors .....	4 female USB type A
------------------	---------------------

### Control/remote — switcher

Serial control port.....	(1) RS-232, 3.5 mm captive screw connector, 3 pole
	(1) RS-232 pass-through, 3.5 mm captive screw connector, 3 pole
Baud rate and protocol .....	9600 baud, 8 data bits, 1 stop bit, no parity
Serial control pin configurations	
RS-232 .....	1 = Tx, 2 = Rx, 3 = GND
RS-232 pass-through .....	1 = Tx, 3 = GND
Contact closure	
SW2 USB.....	(1) 3.5 mm captive screw connector, 3 pole
SW4 USB, SW4 USB Plus .	(1) 3.5 mm captive screw connector, 5 pole
Contact closure pin configurations	
SW2 USB.....	1 = input 1, 2 = input 2, 3 = GND
SW4 USB, SW4 USB Plus .	1 = input 1, 2 = input 2, 3 = input 3, 4 = input 4, 5 = GND
Program control.....	Extron's Simple Instruction Set (SIS™)

### General

External power supply .....	100 VAC to 240 VAC, 50-60 Hz, external; to 12 VDC, 2 A, regulated
Power input requirements .....	12 VDC, 1.5 A
Temperature/humidity .....	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing
	Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling .....	Convection, no vents
Mounting	
Rack mount .....	Yes, with optional rack shelf kits
Furniture mount .....	Yes, with optional under-desk mounting kit
Enclosure type .....	Metal
Enclosure dimensions .....	1.6" H x 8.6" W x 3.0" D
	(1U high, half rack wide)
	(4.1 cm H x 21.8 cm W x 7.6 cm D)
	(Depth excludes connectors.)
Product weight .....	2 lbs (0.9 kg)
Shipping weight .....	3 lbs (2 kg)
Vibration .....	ISTA 1A in carton (International Safe Transit Association)
Regulatory compliances	
Listings.....	CE, c-UL, UL
Compliances.....	CE, C-tick, FCC Class A, ICES, VCCI

---

MTBF..... 30,000 hours  
Warranty ..... 3 years parts and labor

**NOTE**     *All nominal levels are at  $\pm 10\%$ .*

**NOTE**     *Specifications are subject to change without notice.*

## Specifications, Part Numbers, and Accessories, cont'd

### Included Parts

These items are included in each order for the SW USB switcher:

Included Part	Replacement Part Number
SW2 USB	60-952-01
SW4 USB	60-953-01
SW4 USB Plus	60-954-01
3.5 mm, 3-pole captive screw connector with strain relief (3 for SW2 USB, 2 for SW4 USB and SW4 USB Plus)	100-456-01
3.5 mm, 5-pole captive screw connector with strain relief (SW4 USB and SW4 USB Plus)	100-457-01
12 VDC power supply with 2-pole captive screw connector attached	
IEC power cord	
Clear zip ties (3)	
Rubber feet, unattached (4)	
<i>SW USB Series Setup Guide</i>	
Software Products DVD	

### Accessories

#### Optional accessories

Accessory	Part Number
CCR 2BLB Two-Button Contact Closure Remote With Backlit Buttons (black, white)	70-589-02, -03
CCR 4BLB Two-Button Contact Closure Remote With Backlit Buttons (black, white)	70-588-02, -03
CCR 204 Four-Button Contact Closure Remote (black)	60-794-02
IR 102 Remote Control Kit	70-224-01
SW2 VGA Series Switcher	60-257-02, -22
SW4 VGA Series Switcher	60-258-02, -22
PS 1210C 12 V, 1 A Desktop Power Supply	70-775-01
2 pole orange captive screw connectors, 10-pack	100-454-01
3 pole blue captive screw connectors, 10-pack	100-456-01

#### Mounting options

These mounting kits can be purchased for the SW USB:

Mounting Option	Part Number
RSU 129 (9.5" deep 1U universal rack shelf kit)	60-190-01
RSB 129 (9.5" deep 1U basic rack shelf)	60-604-01
RSU 126 (6" deep 1U universal rack)	60-190-10
RSB 126 (6" deep basic rack shelf)	60-604-10
RSF 123 (3.5" deep 1U VersaTools® rack shelf kit)	60-190-20
RSB 123 (3.5" deep 1U VersaTools rack shelf)	60-604-20
MBU 123 VersaTools Mini Under-desk Mounting Kit	70-212-01

# Extron Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

**USA, Canada, South America,  
and Central America:**

Extron Electronics  
1001 East Ball Road  
Anaheim, CA 92805  
U.S.A.

**Japan:**

Extron Electronics, Japan  
Kyodo Building, 16 Ichibancho  
Chiyoda-ku, Tokyo 102-0082  
Japan

**Europe, Africa, and the Middle East:**

Extron Europe  
Hanzeboulevard 10  
3825 PH Amersfoort  
The Netherlands

**China:**

Extron China  
686 Ronghua Road  
Songjiang District  
Shanghai 201611  
China

**Asia:**

Extron Asia  
135 Joo Seng Road, #04-01  
PM Industrial Bldg.  
Singapore 368363  
Singapore

**Middle East:**

Extron Middle East  
Dubai Airport Free Zone  
F12, PO Box 293666  
United Arab Emirates, Dubai

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

*If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.*

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron <b>USA - West</b> Headquarters <b>+800.633.9876</b> Inside USA / Canada Only <b>+1.714.491.1500</b> <b>+1.714.491.1517</b> FAX	Extron <b>USA - East</b> <b>+800.633.9876</b> Inside USA / Canada Only <b>+1.919.863.1794</b> <b>+1.919.863.1797</b> FAX	Extron <b>Europe</b> <b>+800.3987.6673</b> Inside Europe Only <b>+31.33.453.4040</b> <b>+31.33.453.4050</b> FAX	Extron <b>Asia</b> <b>+800.7339.8766</b> Inside Asia Only <b>+65.6383.4400</b> <b>+65.6383.4664</b> FAX	Extron <b>Japan</b> <b>+81.3.3511.7655</b> <b>+81.3.3511.7656</b> FAX	Extron <b>China</b> <b>+400.883.1568</b> Inside China Only <b>+86.21.3760.1568</b> <b>+86.21.3760.1566</b> FAX	Extron <b>Middle East</b> <b>+971.4.2991800</b> <b>+971.4.2991880</b> FAX
--	--	---	---	---	--	---